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**Women in the Navy:
The Past, the Present, and the Future**

Jean W. Fletcher • Joyce S. McManon • Aline O. Quester

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Center for Naval Analyses

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Introduction

The attitudes of the population at large and the expectations of young men and women about appropriate gender roles have undergone a major transformation over the past three decades. Reflecting this transformation, public opinion about the propriety of women serving in the armed forces has also shifted.¹ In this paper, we

- Review traditions that fostered the exclusion of women from military service
- Explore how the nature of modern warfare affected that tradition of exclusion
- Discuss the implications of larger roles for women in the post-Cold War Navy.

First, though, let us set the context for change in the Navy within the broader perspective of societal change.

Technology and tradition

Throughout this century, but particularly since 1950, changes in technology have blurred the traditional distinctions between the characteristics of men's and women's work. At the start of the century, work was quite specialized by gender. Demands in the home—food preparation, laundry, child care—were usually the responsibility of women. Men were more likely to be found selling their labor in urban labor markets or in agriculture.

Labor market

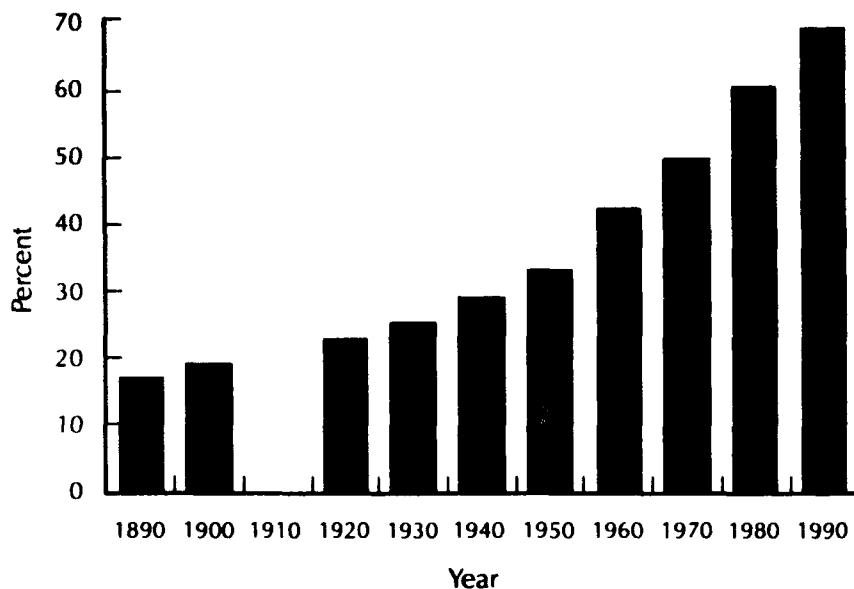
The reasons for this specialization relate to available technologies in the market and the home, as well as to traditions reinforced by sociological norms and biological differences. Explaining labor market patterns at the beginning of the century is beyond the scope of this effort. Instead, we will try to disentangle forces responsible for the changes we have witnessed. And the changes have been dramatic. In terms of proportions of

the labor market involved, the shift of women's productive activities in this century, from work inside the home to work outside the home, is of the same magnitude as the overall shift from agricultural to nonagricultural employment that occurred earlier. Technology played an important role in accelerating both of these structural shifts in economic activity; tradition slowed the processes of change.

Improvements in technology increased the number of labor-saving devices in the home, and more goods that formerly were produced in the home can now be purchased relatively cheaply outside it. Physical strength became less important in many jobs, as technology changed methods of production in the workplace. The decline in the birth rate, partly the result of an improvement in reproductive technology, also reduced work demands in the home and released more time for work outside the home. Improved reproductive technology also provided women with greater ability to control the timing of childbirth, thereby facilitating the pursuit of long-term career goals for women with families.

These advances in technology changed the relative returns for women working inside and outside the home. As it became relatively more profitable for women to work outside the home, they shifted their place of work. Using decennial census data, we illustrate this shift in figure 1. Because the figure plots only the proportion of women working or seeking work outside the home at the time of each census, it ignores an increase in this proportion that occurred during World War II. Although the magnitude of this expansion in women's participation in the labor market is somewhat controversial,² we believe that the increased and varied commitment of women to work outside the home during World War II represents a critical watershed. Large numbers of women worked in occupations that previously had been staffed exclusively by men.³

Figure 1. Percentage of women, aged 20-64, in the labor force



Source: 1890-1980 from *Economic Report of the President*, January 1987 (p. 211); 1990 from *Employment and Earnings*, January 1991.

Gender disparities in occupational distribution still exist in the civilian economy, although the extent of occupational segregation in such professional occupations as law and medicine has declined dramatically in the past 30 years. Much public discourse about inherent gender differences, unit morale, and exposure to risk surrounded the integration of police and firefighting forces, but this integration is perceived as successful, even though the proportion of women in occupations of this type remains small.⁴

Military

Just as technology changed the production of goods in the civilian sector, technology has changed the military and the way we think about and wage war. Technological change has reduced the importance of physical strength for many military jobs.

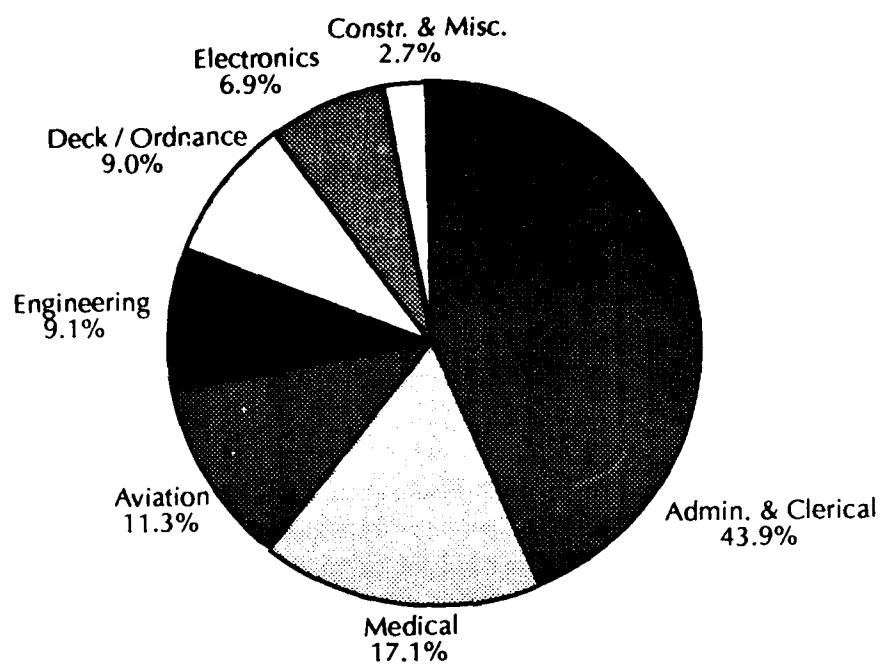
Increasingly, available technologies have blurred the distinction between combat and combat support roles. No longer do we anticipate World War I style trench wars, with a clear demarcation of the battlefield. On one hand, over-the-horizon strategies suggest that military forces will be geographically separated; on the other, situations like Bosnia suggest that everyone in an area, military and civilian alike, is at risk. In brief, few scenarios now portray situations with risk as sharply delineated between military personnel and civilians and between military personnel in combat support and in combat activities as has been true in the past.

Although the proportion of women in the U.S. military is the highest of any country in the world,⁵ only about 10 percent of our military personnel are women. And, the jobs women hold in the military are still predominately those the civilian economy characterizes as traditionally female jobs (see figure 2). For example, in the U.S. Navy, of the roughly 8,000 women officers, 30 percent are nurses; of the 48,000 enlisted women, 61 percent of those "rated" (i.e., skill-qualified)⁶ hold jobs that involve clerical, medical, or administrative duties.⁷

Scope of paper

In the next section, we briefly examine the current forces for change in the role of women in the U.S. military. Then, we turn to a more detailed history of the role of women in the U.S. Navy and the current tensions between technology and tradition and among utilization, opportunity, and cost.

Figure 2. Occupational distribution of enlisted women in the Navy



Source: Tabulations of occupationally qualified enlisted personnel from the Navy Enlisted Master Record File, June 1993.

Forces for change

Gender issues in the military gained visibility through women's participation in the Panama and Persian Gulf operations in 1989 and 1991, respectively. Combat exclusion⁸ appeared to isolate women from some of the rewards but not necessarily the risks of military service. In the spring of 1991, the Defense Advisory Committee on Women in the Service (DACOWITS) voted to ask the Secretary of Defense to request repeal of combat restrictions for women. By December of that year, Congress had voted to allow women officers to be assigned to combat aviation and had authorized a commission to study the matter.⁹ Subsequently, many Americans were further sensitized to issues of gender discrimination and sexual harassment by the public discussion of Justice Clarence Thomas's Senate confirmation hearings. The publicity surrounding the Tailhook incident heightened social awareness of the disparity between the equality of opportunity to choose an occupation in the civilian sector and the formal limitations on the roles of women in the military.¹⁰

The Presidential Commission on the Assignment of Women in the Armed Forces issued its report in November 1992. The commission members were deeply divided over many issues, so much so that at one point the more conservative members staged a walkout. Although the report recommended the elimination of the exclusion from combat vessels, the commission members voted to recommend codification of a ban on women flying combat aircraft and a formal ban on women in ground combat. The reasons cited for the limitations were primarily concerns about the effects of women on unit cohesion and unit morale, the physical performance differences of men and women, and the potential exposure of women to capture. Other concerns expressed in the report were issues of personal privacy, sexual misconduct, family separation, the effect of pregnancy on deployment, and skepticism about the interest of women in nontraditional military occupations.

Despite the commission's report, five months later the Secretary of Defense reported that the military services would open up more occupations and ships to women, that women would be allowed to compete for combat aircraft assignments, and that Congress would be asked to eliminate combat exclusion. The Navy took the lead in these initiatives. In response to media questions, Secretary of Defense Aspin indicated his intention that these changes signal to military women that the days of unequal treatment are behind them.¹¹ In November, 1993, the passage of the 1994 defense authorization bill removed the last legislative barrier to women's assignment to combat ships.¹²

Notwithstanding changes in the political, legal, and social climate, substantial resistance to full integration of women in the military persists. Although the impersonal, high-technology warfare recently observed during Desert Storm makes traditional arguments against women in combat seem less compelling, many insist that physical and psychological barriers to women's participation in combat still exist. Concern about separation of military personnel from young children, particularly when both parents deploy to military conflict, was a controversial issue during the Persian Gulf mobilization. Media discussions of this issue tended to focus on military women, but debate in Congress made it clear that custodial parents sent to the combat zone were both men and women.

Before discussing the relevance of traditional arguments against women in combat to gender integration of the U.S. Navy, we first review the history of women's service in the U.S. Navy.¹³

Historical overview of women's participation in the U.S. Navy

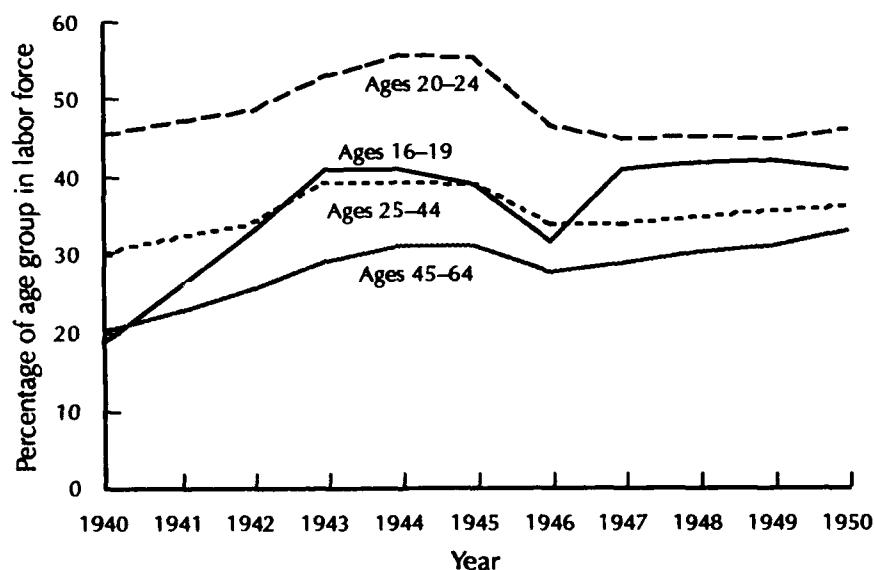
The Navy was the first service to use women in large numbers. The decision by Secretary of the Navy Josephus Daniels to recruit women early in World War I (WWI) required no legal action as the use of women in the military was a sufficiently novel idea that no one had thought to ban it. Almost all of the roughly 13,000 women who served in WWI were either clerical workers or nurses.¹⁴ Women were valued because they were easy to recruit, required little training, and exhibited few discipline problems. Women were eager to join the Navy for both patriotic and economic reasons. Women yeomen (essentially secretaries) held the same rank and received the same pay as their male counterparts—certainly a situation women were unlikely to encounter in the civilian economy of the time.

Before WWI and between WWI and WWII, women were excluded from Navy service, in the first instance by tradition and in the second by law. An exception existed for nurses, who were used in auxiliary status as early as 1908. In both major wars, the role of women was seen as providing support so that more men could be freed from shore-based duty and sent to sea. At the end of each of the major world wars of this century, women constituted roughly 2 percent of the Navy's active-duty strength. We sometimes forget, however, how large the U.S. military was during WWII. More than 3 million Navy men and women were in uniform in 1945.¹⁵ To illustrate the magnitude of the force drawdown after the war, consider that if all the women from WWII had stayed in the Navy, they would have constituted 17 percent of strength in 1950. Although much discussion has focused on the military's dismissal of most women after the war,¹⁶ most men were also sent home. After WWII, the percentage of women in the military would remain between 1 and 2 percent for nearly 30 years.

The magnitude of the mobilization of women during WWII is better appreciated if we also consider the unprecedented

numbers of women who joined the civilian labor force during the war effort. Figure 3 displays female labor force participation rates throughout the 1940s. Young women experienced the most dramatic changes in labor force participation, and the precedent clearly led to stronger labor market attachment for young women in subsequent years.

Figure 3. Women's labor force participation by age, 1940-1950



Source: *Historical Statistics of the United States, Colonial Times to 1970, Part 1*, page 132. Because the data for 1941 were not available by the same age categories, 1941 figures plotted were merely the average of 1940 and 1942 by age categories.

Unlike the limited roles of earlier Navy women, the Navy recruited women in WWII for a variety of occupations. The majority still were nurses and clerical workers, but many were also trained in communications and a range of aviation specialties. In both the Army and the Navy, the aviation communities were more receptive to women in technical and nontraditional

female jobs. Perhaps this readier acceptance of women was due to the newer, less tradition-bound nature of these components, or perhaps the newer technology of aviation involved fewer jobs for which physical strength rather than skill training was a primary prerequisite.¹⁷

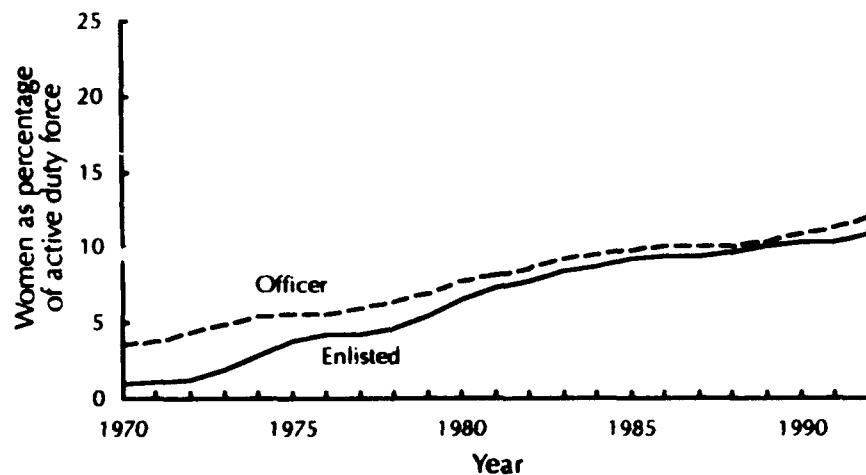
Women weren't banned from military service after WWII as they had been after WWI, but federal legislation passed in 1948 limited women's terms of enlistment, ranks, benefits, and numbers, and specifically excluded women from service in combat positions in the Navy, Marine Corps, and Air Force. Despite the personnel shortages that existed during both the Korean and Vietnam conflicts, women other than nurses were not widely recruited or used in either case.

The next major change for women in the Navy occurred in the 1970s. After having been capped at less than 2 percent of the active force, limits on the fraction of women in the armed forces were lifted by Congress in 1967. But even by 1972, women made up only 1.6 percent of active military strength. Concerns about recruiting a volunteer force, the political and social pressure evidenced by Congressional passage of the Equal Rights Amendment,¹⁸ and the policies of Chief of Naval Operations Zumwalt eventually led to greater recruitment of women. A decade later, women constituted over 7 percent of the active force, and they were being trained as naval aviators, routinely assigned to service on certain classes of noncombatant ships, and admitted to all Navy occupations, although with stringent limits on their numbers in certain seagoing occupations.¹⁹ Women's assignment to noncombat ships gradually expanded in the late 1970s following a ruling in a class-action discrimination suit that automatic exclusion of women from service on ships was unconstitutional.²⁰ In 1988, assignments to ships in the combat logistics force were opened to women.

Figure 4 shows the growth in women's participation in the Navy. About 11 percent of current Navy personnel are women. Because one joins the Navy at only the entry level, the fraction of

women can increase only with higher accession or retention rates for them. In either case, increasing the percentage of women is a slow process, but the percentage will grow because of recent increases in female accessions. Past recruitment practices, however, still limit the pool of women available for top leadership positions. Most admirals, for example, have well over 20 years of service, illustrating why currently only about 2 percent of the flag-level officers are women.

Figure 4. Women in the U.S. Navy, 1970–1992



Source: Department of Defense Selected Manpower Statistics, 1992.

Interestingly, the recent increase in the percentage of women in the Navy was not driven by a shortage of quality male recruits. In the late 1970s, demographers documented the shrinking size of male youth cohorts. Predictions of continued declines in numbers of young males through the 1990s fueled fears about the future cost of recruiting enough able young men to meet military needs.²¹ A combination of the declining availability of good blue-collar jobs in the civilian sector and good

entry-level pay in the military meant the predicted crisis in recruitment failed to materialize. In fact, all four major services continued to recruit increasing proportions of male, high school diploma graduates throughout the 1980s.²² Nevertheless, the services increased their recruitment of women.

Operation Just Cause (Panama) and Operation Desert Shield/Desert Storm opened a new era for Navy women. Women's participation in both conflicts was highly publicized. Women made up almost 7 percent of the total U.S. force in the Persian Gulf.²³ The 3,700 Navy women deployed to the Persian Gulf constituted slightly less than 5 percent of the Navy forces. Both the Department of Defense and the House Armed Services Committee, in their reports on the conflict, lauded the performance and contribution of military women.²⁴

Women in the Navy: characteristics, behavior, and performance

Given the impetus for expanding women's roles, the issues now confronting the Navy involve not just how and by how much to increase the numbers of women in the Navy but also how to integrate women effectively and efficiently into the surface and aviation communities. In what ways will the inclusion of greater numbers of women change the characteristics, behavior, and performance of the enlisted and officer forces? Although many questions remain unanswered due to the relative absence of historical data, a number of studies in the past decade, many of them performed at the Center for Naval Analyses, have compared the characteristics and behavior of women and men in the Navy.

Most of our discussion concentrates on enlisted women. The Navy enlisted force includes about 48,000 women and over 400,000 men and is roughly seven times the size of the officer force. Cost considerations dictated that empirical research on personnel issues focus on the enlisted force. Enlisted occupational specialties are more like blue-collar jobs; officers, on the other hand, are college graduates whose occupations are comparable to professional and managerial jobs in the civilian sector. Analyses of shifts in women's occupational distribution have generally found a much greater tendency toward gender integration in professional and managerial occupations than in blue-collar jobs. For this reason, we believe that gender occupational integration in the Navy will be easier for officers than for the enlisted force.

A fact well known to military personnel planners, but perhaps not always appreciated by the larger community, is the high level of attrition during the first term of enlistment. In the Navy, initial enlistment contracts range from two to six years. The average first-term contract is for slightly over four years. Out of every 100 new accessions in the Navy, only about 65 complete the first term of service: perhaps 8 out of every 100 drop out

during the boot camp period, another one or two leave during occupational training that follows boot camp, and the others drop out over the course of the first-term enlistment contract period. Although this turnover behavior is not so different from that of young adults in the civilian sector (e.g., college completion rates or job changes), there are some important differences related to who pays for training. Unlike the civilian sector, the Navy provides considerable up-front training and pays full wages during the training period. If a recruit leaves before becoming productive (or before there has been a payback period for the training), training dollars are wasted. The cost of such attrition has led researchers to focus on the recruit characteristics that are associated with successful adaptation to military life.

Characteristics

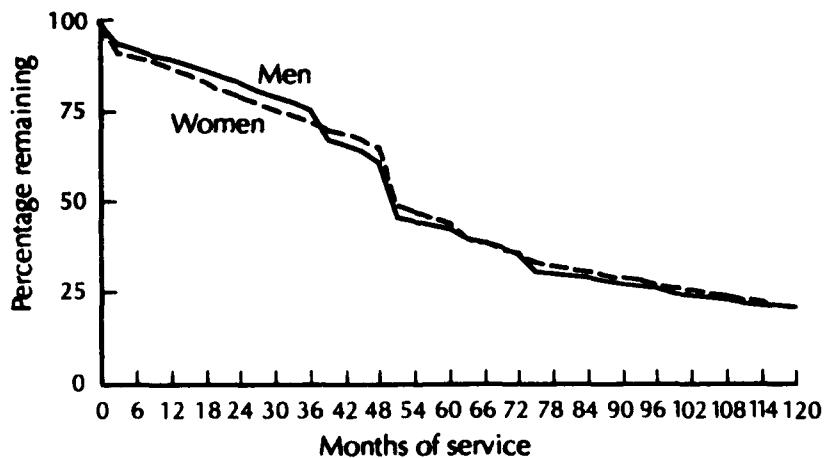
Because the numbers of women accepted have always been quite small relative to the eligible female population, the Navy and the other services have tended to accept only high-quality female recruits. Because a larger fraction of women than men graduate from high school,²⁵ increases in the accession levels of women are likely to continue to increase the average quality of enlistees.²⁶

The Navy places great reliance on skilled, experienced personnel. Having no ground combat function, the Navy has great need for highly trained and experienced technicians to maintain and operate advanced systems. A number of studies have compared the attrition behavior of male and female Navy enlisted personnel for various time periods and lengths of service. Consistent findings are that women's early service attrition rates are slightly higher than those for men.²⁷ The gender difference in attrition declines over time, however, and women actually have somewhat higher average first-term reenlistment rates than do men.²⁸

Behavior

Figure 5 displays the average continuation profiles by gender for the non-prior-service recruits entering the Navy in FY 1982. Quester (1988) found that women's historical retention and promotion rates compared favorably with those of men in the same enlistment programs. Evidence from recent cohorts, then, would not lead us to expect that increasing the numbers of women in the Navy would result in fewer experienced personnel. In fact, overall long-term retention is slightly higher for women than for men. The patterns are particularly interesting when we look more closely at the data. Table 1 displays the percentage of those enlisted personnel entering the Navy in FY 1978 through FY 1983 who were still on active duty after 75 months.²⁹ The significantly larger retention rates for African-Americans, particularly African-American women, are again testament to the military services' reputation for having much more equal opportunity than is available in the civilian economy.³⁰

Figure 5. Continuation patterns for enlisted recruits entering the Navy in FY 1982



Source: 1992 CNA SCREEN database (documented in Cooke and Quester, 1990).

Table 1. Retention rates for FY 1978-1983 enlisted accessions

Demographic category	Percent still on active duty 75 months after initial enlistment
Women	
African-American	45.8
Latina	35.5
All other	28.1
Men	
African-American	35.0
Latino	29.2
All other	26.3

Source: 1992 CNA SCREEN database (documented in Cooke and Quester, 1990).

Because retention is an overall benchmark of employee satisfaction, women appear to be at least as satisfied as men with their career opportunities in the Navy.³¹ Gender differences in pay, of course, are considerably larger in the civilian sector, and there is much greater variance in pay across occupations, so Navy women may feel relatively well-paid given their civilian alternatives. Table 2 compares the ratio of female to male average pay in selected occupations for 1992. For the civilian sector, these ratios will be affected by gender differences in the age and experience distribution as well as any wage discrimination. For the Navy pay ratios, gender differences in pay result from pay differences in average experience, rank, and assignment type. (Special pays are given for arduous assignments, such as sea duty, overseas duty, and hazardous duty.) Because women were previously barred from service on many ship classes, occupations in which men spend a lot of time at sea had larger gender pay differentials in the Navy. Also, because women's accession percentages have grown over the past two decades, enlisted women have lower average rank than do men. The only occupation displayed with larger civilian wage ratio is postal clerk, a civilian occupation composed primarily of unionized Postal Ser-

vice employees. The Navy occupation shown here with the lowest earnings ratio is Electrician's Mate (EM), a sea-intensive job.

Table 2. Relative pay and occupational distribution for selected civilian and Navy occupations

Occupation group	Female-to-male earnings ratio		Percentage female	
	Navy	Civilian	Navy	Civilian
Computer Programmer (DP)	0.98	0.89	33	35
Electronics Technician (ET)	0.85	0.72	7	12
Electrician (EM)	0.74	0.63	5	2
Food Service Supervisor (MS)	0.87	0.76	11	59
Health Technician (HM)	0.94	0.83	20	80
Legal Assistant (LN)	0.96	0.93	37	85
Machinist (MR)	0.86	0.71	9	4
Office Supervisor (YN)	1.03	0.67	21	68
Payroll Clerk (DK)	0.95	0.77	16	88
Police (MA)	0.89	0.88	15	14
Postal Clerk (PC)	0.84	0.96	18	47
Average over all occupations (not just those listed above)	0.89	0.74	10	43

Note: Abbreviations are in parentheses for the Navy Ratings containing job components similar to the civilian occupations listed. Note that the Navy and civilian jobs are not equivalent because Navy occupational specialties will frequently have job duties that overlap with several or no civilian occupations.

Source: The Navy Recruiting Handbook was used to identify civilian occupations with job components similar to Navy occupational specialties. Earnings ratios were calculated for civilian occupations from median weekly earnings of full-time employees (*Employment and Earnings*, January 1992) and for Navy ratings from the Joint Uniform Military Pay system data for December 1991. Navy earnings data calculations include basic and special pays but do not include bonuses, housing and food allowances, or estimated tax benefits.

In brief, we believe that increases in the number of enlisted women are unlikely to alter dramatically the retention patterns for enlisted personnel. One question, however, is how attractive technical and nontraditional, sea-intensive jobs will be to

women. One factor that is perhaps not well understood outside the Navy is the substantial difference in job experience that will occur as the Navy opens up more opportunities to women. Currently, most enlisted women enter the Navy at the age of 18 to 20, with enlistments that vary in length from three to six years. Many of them do not spend much time at sea, but instead occupy jobs in the shore establishment. The combat exclusion law limited the number and types of ships to which women could be assigned. Now that Congress has lifted this exclusion as the Navy and Department of Defense suggested, increasingly more women will go to sea. Whether these opportunities will broaden the appeal of the Navy for women is an open question.

At least some recruiters believe that many of these young women are more attracted by administrative jobs within the shore establishment than by the opportunities for nontraditional jobs at sea. These beliefs, however, are fostered by historical recruiting patterns that focused on spending recruiting resources to attract men, not women, and on an incentive system that rewarded recruiters more for bringing in men. Because accession goals for women have historically been low and recruiters had to attract a much larger fraction of the eligible male population, a much larger proportion of men than women were recruited with guarantees for particular types of technical skill training. During late FY 1992 and early FY 1993, incentives for recruiting women were increased. Given assignment limitations at the time, this change resulted, at least temporarily, in excess numbers of qualified women applicants. This experience suggests that young women are interested in new Navy opportunities. For the college-educated officers, most observers believe that the greater opportunities, resulting from changes in assignment policy, will increase the numbers of qualified women desiring a career in the Navy.

The research on women in nontraditional military jobs is encouraging. In a study that looked across services, Waite and Berryman (1985) found no significant difference in the turnover rates of military women in traditionally female and traditionally

male jobs, and they further found that women in the military exhibited much lower turnover than women in the civilian sector. McDonald and McMahon (1992) tracked those recruited in FY 1987 through FY 1990 and found little difference in the first-term completion rates of comparable groups of women and men, even when they were split into occupation groups with very different proportions of time spent at sea. They also reported that women were less likely than men to be placed in the occupation promised upon entry, a fact that might have been expected to diminish female continuation rates.

Performance

Although data on productivity are extremely limited for women in the Navy, the few studies of women's job performance do not conclude that the greater integration of women would degrade performance. Thomas and Greebler (1983) surveyed crews of eight noncombatant ships one to two years after the integration of women into their crews. They concluded that integration was considered successful and led to no perceived decline in readiness. A study of Navy Surface Warfare Officers found that women had higher qualification rates than men, although the number of women in the community was very small and women had lower graduation rates from the surface warfare officer basic school.³²

Studies of disciplinary problems and demotions in the Navy have consistently found that enlisted women have much lower rates of unauthorized absence, desertion, and demotion than do men.³³ In fact, a study of days lost from the job by Navy personnel during their first terms of enlistment found that hospitalization was the primary cause of time lost from work for women and disciplinary reasons were responsible for most lost days for men. On average, absences for these two reasons were larger for men than for women (Thomas, Thomas, and Robertson, 1993).³⁴ A concern that remains is whether unanticipated pregnancies will result in a greater disruptive influence on deployments than do the types of absences from work experienced by men.

Again, because such a small fraction of eligible women were recruited by the Navy in the past, recruiters could be very selective about the female recruits they admitted. Little effort has been exerted specifically to attract women, so those volunteering are no doubt highly motivated to join the Navy. Thus, increasing female accessions by a large amount might possibly lead to higher levels of attrition and behavioral problems for women than experienced in the past. On the other hand, it is possible that recruiting larger numbers of women, having more women in leadership positions, and giving women access to all possible assignments might make the military experience more hospitable for women and lead to higher retention than in the past.

Despite these recent indications of change, encouraging research findings about women's recent Navy experience, and policy statements on integration, it is not clear how fast or how complete gender integration will be. It is likely that substantial opposition to greater reliance on women in the military remains in some quarters. To better understand this resistance to change, we will briefly review the forces for change and the controversies surrounding the employment of women for military service in general and in the Navy in particular.

Reviewing the arguments

Technological change has greatly reduced the fraction of military jobs requiring physical-strength standards that women would be less likely to meet. The reduction in reliance on physical strength and the increasing specialization accompanying technological change have weakened some arguments against employment of women in the military. Also, long-range missiles and other weapons have blurred the distinctions between combat and noncombat jobs.

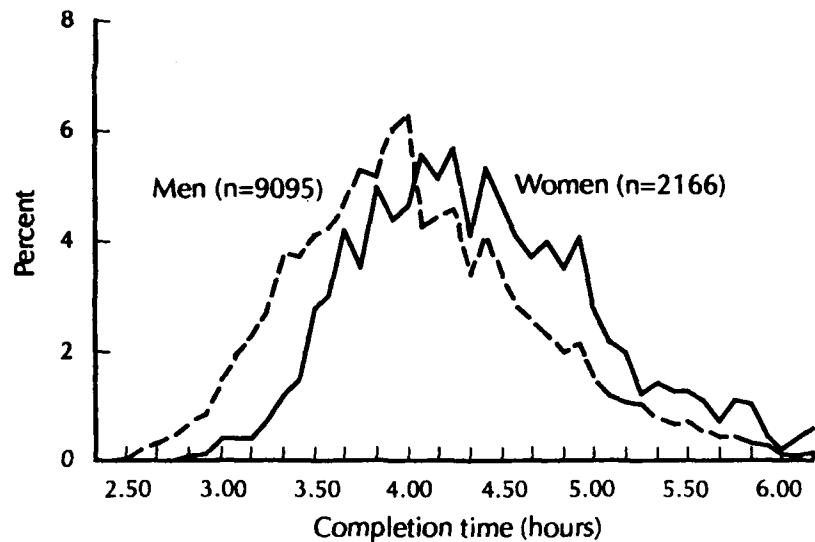
However, to the extent that opposition to women in combat is related to values (e.g., women should be protected from danger) rather than effectiveness or efficiency, the effects of military technological innovations are ambiguous. The high technology, fluid warfare witnessed in Desert Storm resulted in relatively few U.S. casualties but may have diminished the safety of traditionally noncombat jobs. Media coverage of the conflicts in Panama and the Persian Gulf made clear the increasingly arbitrary nature of the combat designation. No women were assigned to combat units in the Persian Gulf, yet women constituted approximately 6.8 percent of U.S. forces in-theater and made up slightly more than 5 percent of the U.S. fatalities reported; 2 of 21 U.S. service members captured as prisoners of war were women.³⁵

Among military services, technology favors greater use of women in the Navy and the Air Force. In the Army and Marine Corps, there are still a number of jobs that require an unusual degree of strength, particularly in the Marine Corps where 32 percent of the enlisted force is in the infantry. Ground combat troops are required to be able to field march with a heavy pack. In addition, these troops have the potential to engage in direct combat with the enemy, and the issue of absolute physical strength is not irrelevant.

Even in jobs where strength or other physical attributes are critical, however, it's important to remember that averages mask variation. For example, just because the average man is taller

and heavier than the average woman does not mean that all men are taller and heavier than all women. Completion times for the Marine Corps Marathon illustrate this point. Figure 6 shows the distribution of men and women finishing the 26-mile race by completion time. The average completion time for men is less than the average for women, but the differences aren't that large, and a considerable number of women finished in less time than the average for men. In fact, the first woman finished 116th out of the 11,261 people who completed the race, and the difference was less than 10 percent between the average completion time for women (4 hours and 21 minutes) and the average for men (4 hours). Nineteen percent of individuals who completed the marathon were women.

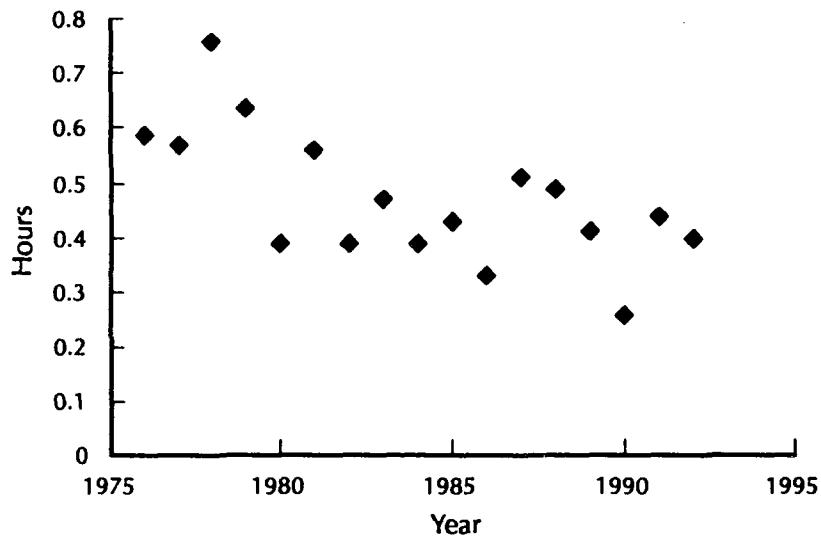
Figure 6. Marine Corps Marathon results by gender, 1992



Source: XXVII Annual Marine Corps Marathon Official Results. There were 11,440 male and 2,890 female entrants; 79 percent of the males and 75 percent of the females completed the marathon.

Figure 7 illustrates that over time the gap between the times of the top male and female finishers has narrowed. Reasons include more interest by women in physical fitness and the implementation of Title IX legislation, which prohibits discrimination by gender, effectively requiring greater funding of women's sports. Thus, defining eligibility by gender eliminates a large number of qualified people and is becoming less efficient.

Figure 7. Difference between women's and men's first place times,
Marine Corps Marathon



Source: XVII Annual Marine Corps Marathon Official Results

Strength is not the only important physical attribute, however; in the Navy and Air Force, technology often favors people with a compact body type. Ships, submarines, and aircraft are all space-limited and are friendlier to people who are not tall or bulky. Of the physical attributes of importance in most military jobs—strength, agility, quick reflexes, and endurance—women are at a relative disadvantage for only the first. Strength, however, is probably less important than agility, reflexes, and

endurance for both the Air Force and the Navy. In fact, the Navy has few occupations where unusual strength or physical capabilities are required (SEALs, for example), and these occupations are relatively small in terms of the numbers needed.

In the Navy, one would have to go back to sailing ships to find a time when strength played a predominant role for a large number of personnel. In the history of the Navy since World War II, technology has consistently eroded the value of raw strength. The reliance on high-tech equipment has increased the need to enlist intelligent sailors who are adaptable and learn quickly.

The Navy currently requires large numbers of highly skilled, technical officers and enlisted personnel, and values retention of those who have received expensive technical training. Well-documented gender differences in technical fields of study might appear to limit the growth of women in the Navy.³⁶ Yet, each year increasing numbers of women choose technical fields of study. A primary inducement to choose any occupation is pay. In the rigid military pay structure, men and women of equal rank and experience generally earn the same wage.³⁷ This situation contrasts with that in the civilian sector. This greater equality of earnings in the military would tend to attract women; however, military assignment policies precluded women from many military jobs.

The future

The issues repeatedly raised in the context of gender integration include concerns about unit cohesion, physical standards, risk of capture or death, privacy, sexual misconduct, family separation, pregnancy, and willingness of women to hold nontraditional jobs. Some of these topics are amenable to analysis, others are not, and all may be resolved politically. Clearly at issue are cost and effectiveness.

The most common arguments fielded against women's participation in combat have to do with issues of physical strength, aggressiveness, and unit cohesion. We earlier asserted that the Navy's absence of ground combat forces and heavy reliance on high-technology equipment mitigate the importance of the first two issues. Concerns about deleterious effects of gender integration on unit morale and cohesion also fall largely outside the area of empirical research, as there is little historical experience with mixed-gender units.

The few historical examples of gender integration in the U.S. military are insufficient grounds for making generalizations, but they were generally successful. For instance, during WWII, the Navy Aeronautics Bureau and the Bureau of Medicine integrated women into their training structure, while Navy women in clerical and communication jobs underwent segregated training. Ebbert and Hall (1993) conclude that joint training resulted in greater credibility and acceptance by male colleagues.³⁸ Another WWII experiment was the formation by Army Chief of Staff George Marshall of mixed-gender antiaircraft artillery units; the performance of these units was reported to have been superior to that of all-male units.³⁹ The participation of women in resistance movements lends credence to the argument that when the cause is considered important enough, all useful resources are valued and the participation of women is welcomed.⁴⁰

Little is known about the job performance differences of men and women; in fact, relatively little is known about performance

and productivity in general. Studies of proxies for individual and unit performance, such as training success, supervisor ratings, and readiness measures, either have not explicitly compared men and women or have found little difference by gender.⁴¹

An extensive literature search on unit cohesion and its relation to performance led to the conclusion that task cohesion (pursuit of a common goal requiring cooperation among unit members) rather than social cohesion (emotional bonds of comradeship and caring) is related to performance. Although social cohesion seems to be linked to homogeneity of unit members, task cohesion is not.⁴² Given the limited data and extensive non-military research in this area, it seems appropriate to put this issue to rest until and unless experience after integration proves the existence of a problem.

The same technological innovations that have transformed modern warfare in ways that blur the risk differentials of combatants and noncombatants have apparently also reduced the risk of capture and death for military personnel. Some argue that the American public has a low tolerance for casualties in the post-Vietnam era, and that the political repercussions of casualties have defined the types of military actions the United States has been willing to undertake in recent years. In any case, the dissenting statement to the combat aviation exclusion recommendation of the Presidential Commission on the Assignment of Women in the Armed Forces correctly points out that combat exclusion policies have not sheltered women from prisoner-of-war status, injury, or death.⁴³ The same statement cited testimony discounting fears that male prisoners would be adversely affected by their protective instincts toward women. To deny women the choice of accepting this risk implies either that female lives are inherently more valuable than male lives or that women are not entitled to make (or worse, are not capable of making) informed decisions. We reject both of those premises.

Issues related to privacy, sexual misconduct, and family separation might be categorized more properly as human relations

problems than women's issues. Single parenthood has risen rapidly in the past decade. This issue relates to readiness and must be dealt with by the Navy regardless of parental gender. Privacy concerns and problems of sexual misconduct have already been dealt with in the units (including about 40 ships) where women now serve. The Navy has put more command attention on sexual harassment and issued guidance on the appropriateness of various behaviors. To the extent that facilities must be modified to increase privacy in a mixed-gender environment, privacy also becomes a cost issue, and assessments are under way in the Navy to estimate the cost of modification for various ship classes.

The question of pregnancy-related absences of Navy women was discussed briefly earlier in the paper, and to some extent the fact that some young women will become pregnant during military service just has to be accepted and adjusted to. The largest problem that pregnancies pose for the Navy is dealing with unanticipated pregnancies during deployment. The assignment process is stressed because pregnant women must be reassigned from deployed ships and are not permitted to go under way for any period after the twentieth week. The great majority of reassignments from ships for reasons of pregnancy are for enlisted women in their first terms of service. Age at enlistment is strongly correlated with attrition for reasons of pregnancy for enlisted women. In fact, these attrition rates decline monotonically with age at entry, from almost 13 percent for women entering at the age of 17 to about 6 percent for women entering at age 25 or older.⁴⁴ Large differences in pregnancy rates by ship⁴⁵ may be indicative that leadership and training are key to minimizing pregnancy during sea tours, and special attention should probably be paid to young enlisted women. We must not forget, however, that even though the Navy has longer experience dealing with the problems of young enlisted men, these problems entail costs, too.

Whether large numbers of women will choose a Navy career, and then further select a traditionally male occupation, is an important issue for Navy resource managers who must now

decide how to spend scarce recruiting and training dollars. Because quotas on female accessions have historically been low, it has not been necessary for the Navy to actively recruit young women. Almost all studies of recruiter productivity, advertising effectiveness, and recruiting policy have dealt exclusively with male recruits. Will young women behave similarly?

Navy occupations with the most sea-intensive assignments are also those that typically have the largest bonuses and highest special pays. Until now, women were legally barred from most of these assignments. As the Navy opens more occupations and assignments, it is important that expectations about women's choices of technical or nontraditional military jobs not be based solely on generalized observations of past behavior—behavior when enlisted women made limited choices under stringent assignment constraints. For example, several experiments during the past two years varied recruiter incentives for women recruits. They appear to have been successful in attracting women recruits to a wider variety of occupations. Further gender integration will increase the size and quality of the pool of potential enlistees and officers. It will also improve gender equity.

Harking back to its early leadership role in the employment of women, in early April 1993, the Chief of Naval Operations, Admiral Frank Kelso, endorsed a plan to ask Congress to reverse the long-standing ban on women in combat. Later that same month, the Secretary of Defense and the chiefs of the Army, Air Force, Navy, and Marine Corps held a press conference to announce major initiatives for the increased use of women in each of the services. The Navy's plans were the most ambitious.⁴⁶ In November 1993, Congress passed the 1994 Defense Authorization Act, which eliminated combat exclusion, and thus the legal restriction on the assignment of women. The Navy has plans, subject to Congressional ratification, to embark women on surface combatant vessels later this year. In the Atlantic Fleet, the aircraft carrier *Eisenhower* and its Carrier Air Wing 3 will have women aboard this spring. The carrier battle group will deploy in the fall of 1994. Similar changes will occur in the Pacific Fleet. This is an exciting time.

Endnotes

1. A survey reported in the *Report to the President of the Presidential Commission on the Assignment of Women in the Armed Forces* (1992) found that slightly over half those polled thought women should be drafted in the event of a crisis requiring conscription. Wilcox (1992) finds strong public support for military gender integration (except in ground combat units).
2. According to *Historical Statistics of the United States, Colonial Times to 1970* (p. 132), the female labor force participation rate in 1945 was 35.8 percent for all women (not just those aged 20–64), up from 25.8 percent in 1940. By 1950, this rate had dropped to 29.9 percent. The controversy involves both an accurate measurement of the proportion of women working during the war as well as the extent of the drop in labor force participation after the war.
3. A 1944 *National Geographic* article chronicles the presence of women in jobs critical to the war effort. The unprecedented nature of women's wartime roles is underscored by the many comparisons to domestic chores; for example, the article describes riveting as "a kind of needlepoint in metals." (*National Geographic*, August 1944, page 198).
4. Women as a percentage of police, detectives, sheriffs, and bailiffs rose from 6.2 percent in 1980 to 12.5 percent in 1992 (*Employment and Earnings*, January 1981 and January 1993), and by 1993 women were 20 percent of the more general protective services occupational group, which includes those listed above as well as corrections officers and guards (Library of Congress, 1993). By comparison, women make up 15 percent of the Master at Arms occupational specialty in the Navy. Firefighters, whose close quarters and unusual shifts perhaps more closely mirror conditions in military units, are still overwhelmingly male

(96.7 percent) even though the percentage female has doubled over the past decade.

5. Canada and Israel are close in percentage but have much smaller forces. See the *Presidential Commission on the Assignment of Women in the Armed Forces* (1992), p. C-31, for country comparisons.
6. In the Navy, occupations are called ratings. One-third to one-half of entering Navy personnel are not rated. They will be used in general detail jobs (airman, seaman, and fireman). They may or may not become rated (occupationally qualified) during the first term of service.
7. On the other hand, even though women sailors are disproportionately found in this occupational subset, the gender mix of these occupations in the Navy is different from that in the civilian sector. For example, 94 percent of civilian nurses are women, but only 74 percent of Navy nurses are women. And 80 percent of enlisted administrative, medical, and food preparation workers are men.
8. Language in Section 6015 of U.S. Code 10, passed in 1948, prohibited women from serving on ships expected to be assigned to combat missions. Definitions and detailed explanations of combat exclusions and the risk rule can be found in Becroft (1991).
9. Five retired military officers, two active-duty officers, and eight civilians were appointed to the Presidential Commission on the Assignment of Women in the Armed Forces. They were charged by Congress to make recommendations about legislation, standards, and assignments affecting the military service of women.
10. The military has long been credited with leading society in racial integration and policies of equality of opportunity by race. With women, however, the combat exclusion and the risk rule (a Department of Defense policy that does

not allow women to hold a position in a noncombat unit expected to experience a risk of exposure of hostile fire or capture that is greater than or equal to that of combat units in the same theater) have meant restricted opportunity. In the public debate about the causes of Tailhook, some argue that the restricted roles of women in the Navy indirectly but inevitably led to second-class citizenship. A recent *Navy Times* article (January 3, 1994, page 18) reported that Admiral Kelso, the Chief of Naval Operations, acknowledged concern over this issue.

11. DOD News Briefing, Wednesday, April 28, 1993, by Secretary of Defense Les Aspin and Service Chiefs, Office of the Assistant Secretary of Defense (Public Affairs).
 12. The bill did require a 30-day advance notice before assigning women to combat vessels.
 13. For an interesting history of Navy women, see Ebbert and Hall (1993). Unless otherwise noted, factual historical information in the following section comes from that source.
 14. Between 20 and 30 percent of all civilian working women in 1920 held one of these occupations (*Historical Statistics of the United States, Colonial Times to 1970*, Table D, pp. 182-232).
 15. Downey (1993) details military strength by service since 1900 in annex A-3.
 16. This is a prominent issue in a popular documentary film, *The Life and Times of Rosie the Riveter*.
 17. The U.S. Air Force did not exist as a separate service until 1945. The greater dependence on women in aviation has continued to the present; the Air Force consistently had the highest percentage of female accessions during the 1980s and 1990s. In 1992, more than 20 percent of Air Force enlisted recruits were women.
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18. This amendment was not ratified by enough states to become part of the Constitution.
 19. The Navy's need to maintain an acceptable sea/shore rotation rate for the males who can be assigned to combat positions at sea limits the number of women in these occupations. Thus, not all positions ashore in a given occupational field can be given to women; otherwise, there would be no jobs ashore for men on completion of a sea-duty tour.
 20. For a discussion of this court case (*Owens v. Brown*) and its consequences, see *Holm* (1982).
 21. For a discussion of the youth dearth, see *Lockman and Quester* (1985).
 22. A large body of personnel research has established that high school diploma graduates have lower attrition and fewer disciplinary problems than nongraduates. See *Lockman* (1987), and *Cooke and Quester* (1992).
 23. We have found estimates ranging from 31,000 to more than 40,000 for the number of U.S. military women in the Persian Gulf conflict (in excess of 33,300 from *Becraft* (1991, p.1); more than 40,000 from the Presidential Commission on the Assignment of Women in the Armed Forces (1992, p. iii); from *Aspin and Dickinson* (1992, p. 48), more than 35,000; from *Ebbert and Hall* (1993, p. 267) more than 31,000.
 24. Department of Defense (1992), Appendix R, and *Aspin and Dickinson* (1992), p. 49.
 25. *Digest of Education Statistics* (1990), National Center for Education Statistics, p. 110.
 26. Most of the work on enlistment standards was done with reference to males, so an important question is whether the same quality screens are relevant for female recruits.
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As accessions of women began to increase in the late 1970s, studies generally demonstrated that the same factors useful for predicting success for male recruits were also good predictors for women.

27. See Quester & Murray (1986), Cymrot (1986b), Cooke and Quester (1989), and Quester (1990a).
28. These results are found for both prior-service and non-prior-service recruits. See, for example, Cymrot (1986a), Quester (1988), Cooke and Quester (1989), and Shiells and McMahon (1993). Similar results were reported for Marine Corps women in Quester, North, and Kimble (1989). Kostiuk and Follman (1988) also found higher retention rates for women in the Navy Selected Reserve. On the officer side, McMahon (1989) found that female and minority Navy physicians had higher retention rates than did white males.
29. The Navy has a number of different enlistment programs with contract obligations ranging from two to six years. Seventy-five-month retention was chosen because, by that time, all remaining personnel will have made a reenlistment decision.
30. A recent *Wall Street Journal* article (Rochelle Sharpe, "Losing Ground: In Latest Recession, Only Blacks Suffered Net Employment Loss," September 14, 1993) reported that African-American workers were disproportionately represented among those who lost jobs in the most recent recession. In 1992, earnings of African-American full-time civilian workers averaged only 77 percent of those earned by other workers (calculated from median weekly earnings of full-time wage and salary workers by selected characteristics, *Employment and Earnings*, January 1993).

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31. In a 1985 DOD survey, a higher percentage of both officer and enlisted women reported being satisfied or very satisfied with their military life than did their male counterparts (Quester, 1988).
 32. See Cymrot (1990). A study of reserve recruiter productivity [Kostiuk, Follman, and Grogan (1988)] also found that women recruiters were more productive than men, other things equal.
 33. See Lurie (1983), Quester (1988), and Thomas, Thomas, and Robertson (1993).
 34. Thomas, Thomas, and Robertson (1993) also report results of a field study of all types of absences from work for a sample of enlisted personnel in paygrades E-1 to E-6. They conclude that total hourly absences of men and women do not differ significantly.
 35. Calculated from information given in appendices A and R from Department of Defense, *Conduct of the Persian Gulf War, Final Report to Congress*, April 1992.
 36. In 1988, only 14 percent of the bachelor's degrees in engineering and 30 percent of physical science bachelor's degrees were granted to women, despite the fact that women constituted more than 50 percent of undergraduates (*Digest of Education Statistics*, 1990).
 37. There are some occupational pay differences as well as some extra pay for sea duty and hazardous assignments.
 38. This experiment is discussed in Campbell (1992), page 14.
 39. Ebbert and Hall (1993), page 71.
 40. See George Quester (1982) for a discussion of the sketchy existing evidence on the performance of women in combat roles.
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41. In one such study, Byrnes and Marcus (1989) found no significant gender differential in training success for enlisted medical specialized skill training.
 42. MacCoun (1993) surveyed this literature and developed the conclusions stated here.
 43. Interestingly, five of the seven active-duty or retired military officers serving on the commission signed this dissent.
 44. This result was observed for both Navy and Marine Corps enlisted women. See Quester (1990a) and Quester (1990b).
 45. Information from briefing by Cdr. Hillery (Pers 409), September 1993.
 46. The Air Force, despite having recruited in recent times the largest fraction of women of any service, is widely reported to have been opposed to women in combat aviation. *The Baltimore Sun* ("Air Force to stop training women in combat planes," by Richard Sia, April 7, 1993, page 1) reported that the Air Force intended to eliminate training for women in aircraft used for combat aviation. The same article indicated that the Air Force Chief of Staff, General McPeak, opposed women serving in combat aviation.

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